

What is claimed is:

1 1. A method for performing channel estimation within a communication system
2 implementing orthogonal frequency division multiplexing (OFDM), comprising:
3 receiving an OFDM symbol from a communication channel, said OFDM
4 symbol having a plurality of data subcarriers and a plurality of pilot symbols;
5 identifying subcarriers of interest;
6 generating a pilot vector using pilot symbols from said OFDM symbol;
7 obtaining a first interpolation vector corresponding to a first subcarrier of
8 interest; and
9 calculating a dot product of said pilot vector and said first interpolation vector
10 to generate an equalization coefficient for said first subcarrier of interest.

1 2. The method of claim 1, comprising:
2 obtaining an interpolation vector corresponding to each subcarrier of interest;
3 and
4 calculating a dot product of said pilot vector and an interpolation vector for each
5 subcarrier of interest to generate an equalization coefficient for each subcarrier of
6 interest.

1 3. The method of claim 1, wherein:
2 generating a pilot vector includes selecting a set of pilot symbols from said
3 OFDM symbol based upon the identities of said subcarriers of interest.

1 4. The method of claim 1, wherein:
2 generating a pilot vector includes using all pilot symbols within said OFDM
3 symbol.

1 5. The method of claim 1, wherein:
2 obtaining a first interpolation vector includes selectively retrieving said first
3 interpolation vector from a memory.

1 6. The method of claim 1, wherein:
2 identifying subcarriers of interest includes identifying subcarriers associated
3 with a first user within the communication system.

1 7. A communication device for use in a communication system implementing
2 orthogonal frequency division multiplexing (OFDM), comprising:
3 means for receiving an OFDM symbol from a communication channel, said
4 OFDM symbol having a plurality of subcarriers and a plurality of pilot symbols;
5 means for extracting a group of pilot symbols from said OFDM symbol to form
6 a pilot vector;
7 means for acquiring an interpolation vector associated with a first subcarrier of
8 interest; and
9 means for performing a mathematical operation using said interpolation vector
10 and said pilot vector to generate a first equalization coefficient for said first subcarrier
11 of interest.

1 8. The communication device of claim 7, wherein:
2 said means for performing a mathematical operation includes means for
3 calculating a dot product of said pilot vector and said interpolation vector.

1 9. The communication device of claim 7, comprising:
2 means for acquiring an interpolation vector associated with each of a set of
3 subcarriers of interest; and
4 means for calculating a dot product of said pilot vector and each of said
5 interpolation vectors acquired by said means for acquiring to generate equalization
6 coefficients for said set of subcarriers of interest.

1 10. The communication device of claim 9, wherein:
2 said subcarriers within said set of subcarriers of interest are associated with a
3 single user within the communication system.

- 1 11. The communication device of claim 7, wherein:
2 said communication device is a portable communicator.
- 1 12. The communication device of claim 7, wherein:
2 said communication device is a communication base station.
- 1 13. The communication device of claim 7, wherein:
2 said communication device includes a wireless OFDM transceiver.
- 1 14. The communication device of claim 7, wherein:
2 said means for acquiring an interpolation vector includes means for selectively
3 retrieving an interpolation vector from a memory.
- 1 15. The communication device of claim 7, wherein:
2 said means for extracting a group of pilot symbols includes means for extracting
3 all of said pilot symbols in said OFDM symbol for inclusion within said pilot vector.
- 1 16. The communication device of claim 7, wherein:
2 said means for extracting a group of pilot symbols includes means for extracting
3 a subset of said pilot symbols in said OFDM symbol for inclusion within said pilot
4 vector.
- 1 17. The communication device of claim 7, wherein:
2 said means for acquiring an interpolation vector and said means for performing
3 a mathematical operation are each implemented in software within a digital processing
4 device.
- 1 18. The communication device of claim 7, comprising:
2 means for processing a first subcarrier of interest within said OFDM symbol
3 using said first equalization coefficient.

1 19. A communication device for use in a communication system implementing
2 orthogonal frequency division multiplexing (OFDM), comprising:
3 a receiver to receive an OFDM symbol from a communication channel, said
4 OFDM symbol having a plurality of subcarriers and a plurality of pilot symbols;
5 a subcarrier tracking unit to track subcarriers of interest;
6 a pilot vector unit to assemble a pilot vector using pilot symbols from the
7 OFDM symbol;
8 an interpolation vector retrieval unit to retrieve an interpolation vector for each
9 of said subcarriers of interest from a memory; and
10 a computation unit to determine a channel estimate using said pilot vector and
11 said interpolation vectors retrieved by said interpolation vector retrieval unit.

1 20. The communication device of claim 19, wherein:
2 said subcarrier tracking unit tracks subcarriers associated with a particular user.

1 21. The communication device of claim 19, wherein:
2 said pilot vector unit selects pilot symbols from the OFDM symbol based on
3 said subcarriers of interest indicated by said subcarrier tracking unit.

1 22. The communication device of claim 19, wherein:
2 said pilot vector unit assembles pilot vectors of varying length.

1 23. The communication device of claim 19, wherein:
2 said interpolation vector retrieval unit retrieves interpolation vectors that each
3 have a length that is equal to that of said pilot vector.

1 24. The communication device of claim 19, wherein:
2 said computation unit includes a digital processor to calculate a dot product of
3 said pilot vector and an interpolation vector.

1 25. A computer readable medium having program instructions stored thereon for
2 implementing a method to determine a channel estimate within an orthogonal frequency
3 division multiplexing (OFDM) communication system when executed within a digital
4 processing device, said method comprising:
5 determining a set of subcarriers of interest;
6 forming a pilot vector using pilot symbols from an OFDM symbol;
7 obtaining a first interpolation vector corresponding to a first subcarrier of
8 interest; and
9 calculating a dot product of said first interpolation vector and said pilot vector
10 to generate an equalization coefficient for said first subcarrier of interest.

1 26. The computer readable medium of claim 25, wherein:
2 determining a set of subcarriers of interest includes identifying a user and
3 determining a set of subcarriers assigned to said user.

1 27. The computer readable medium of claim 25, wherein:
2 forming a pilot vector includes selecting pilot symbols for inclusion within said
3 pilot vector based on said set of subcarriers of interest.

1 28. The computer readable medium of claim 25, wherein:
2
3 obtaining a first interpolation vector includes retrieving said first interpolation
4 vector from a memory.

1 29. The computer readable medium of claim 25, wherein said method comprises:
2 obtaining interpolation vectors for each subcarrier within said set of subcarriers
3 of interest; and
4 calculating a dot product of said pilot vector and each of said interpolation
5 vectors to generate equalization coefficients for each subcarrier within said set of
6 subcarriers of interest.